4.3 Air Quality

Issues (and Supporting Information Sources):		*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
3.	**AIR QUALITY** Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. **Would the project:**				
a)	Conflict with or obstruct implementation of the applicable air quality plan?	☒	☐	☐	☐
b)	Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☒	☐	☐	☐
c)	Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☒	☐	☐	☐
d)	Expose sensitive receptors to substantial pollutant concentrations?	☒	☐	☐	☐
e)	Create objectionable odors affecting a substantial number of people?	☒	☐	☐	☐

4.3.1 Setting

This section evaluates the potential impacts of the proposed project on regional and local air quality from both stationary and mobile sources of air emissions. Development of this section was based on a review of existing documentation of air quality conditions in the region, air quality regulations from the U.S. Environmental Protection Agency (U.S. EPA), the California Air Resources Board (CARB), and the Northern Sierra Air Quality Management District (NSAQMD).

The NSAQMD is comprised of three contiguous, mountainous, rural counties in northeastern California (Nevada, Sierra, and Plumas counties). The NSAQMD is part of the Mountain Counties Air Basin. The District enforces controls on stationary sources of air pollutants through its permit and inspection programs and regulates open burning. Through its permitting powers, the District enforces limitations for emission of criteria and toxic air contaminants. Other NSAQMD responsibilities include monitoring air quality, preparing of clean air plans, and responding to citizen air quality complaints.

Terrain, wind, atmospheric stability, and sunlight can affect air quality. The project is proposed in western Nevada County, an area with gentle to steep topography, warm to hot and dry summers, and cool and wet winters. Grass Valley is bounded by the Central Valley on the west and the Sierra Nevada Mountains to the east. The area has a Mediterranean climate type, with pronounced summer and winter seasonal variation in temperature and precipitation. Most precipitation occurs

from late October through early May with winter precipitation falling as rain or snow. Temperature variation is relatively high seasonal, as well as daily. The average annual temperature is 54.9ºF with approximately 54 inches of precipitation[1]. Wind direction tends to be southwesterly. Surface and elevated inversions are common in the late summer and fall. These inversion layers can cause stagnation of airflow, allowing air pollutants to become concentrated. Westerly winds can transport pollutants into the area from the Sacramento Valley and Bay Area.

The NSAQMD maintains ambient air quality monitoring stations in Nevada County. The closest monitoring site to the project site is in Grass Valley (at the Litton Building), approximately two miles from the project site. Ozone, particulate matter equal to or less than 10 microns (PM10), and particulate matter less than 2.5 microns (PM2.5) are currently monitored at the Grass Valley monitoring station. In the most recent five-year period (2001 – 2005), there were numerous recorded instances of exceeding the national or state standards for ozone and no recorded instances of exceeding the state or national standards for PM10. Sampling of PM2.5 began during 1999, and no instance of exceeding the federal standards was recorded. **Table 4.3-1** includes a comparison of monitored air pollutant concentrations with state and national ambient air quality standards.

Sensitive Receptors

Some receptors are considered more sensitive than others to air pollutants. The reasons for greater than average sensitivity include pre-existing health problems, proximity to emissions source, or duration of exposure to air pollutants. Schools, hospitals, and convalescent homes are considered to be relatively sensitive to poor air quality because children, elderly people, and the infirm are more susceptible to respiratory distress and other air quality-related health problems than the general public. Residential areas are considered sensitive to poor air quality because people usually stay home for extended periods of time, with associated greater exposure to ambient air quality. Recreational uses are also considered sensitive due to the greater exposure to ambient air quality conditions because vigorous exercise associated with recreation places a high demand on the human respiratory system.

The Round Hole site is currently vacant except for an old mining shaft that is covered. The lands west and south of the property are developed as a business office park. The adjacent properties are vacant lands, with the exception of buildings located to the southwest. There are buildings located across the street along Whispering Pines Lane. At the Idaho-Maryland site, adjacent land northeast of Centennial Drive and on either side of Whispering Pines Lane have been developed for business office uses. There are several residences within 0.5 miles to the south and west of the Idaho-Maryland site. At the New Brunswick site, rural residential are located to the north and east, and the property surrounds a residential lot; the old Bohemia Mill site is to the south. There are numerous residences along the haul truck route. There are no schools along the proposed haul routes or adjacent to the mine sites; however, the Sierra Nevada Memorial Hospital is located approximately one mile to the north of the Idaho-Maryland site at 155 Glasson Way in Grass Valley.

[1] http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?cagras+nca

TABLE 4.3-1
AIR QUALITY DATA SUMMARY (2001-2005) FOR THE REGIONAL PROJECT AREA

Pollutant	Standard[a]	Monitoring Data by Year				
		2001	2002	2003	2004	2005
Ozone						
Highest 1 Hour Average (ppm)[b]		**0.126**	**0.127**	**0.117**	**0.126**	**0.128**
Days over State Standard	0.09	17	20	20	11	15
Days over National Standard	0.12	0	1	0	1	1
Highest 8 Hour Average (ppm)[b]		**0.106**	**0.113**	**0.103**	**0.111**	**0.120**
Days over National Standard	0.08	23	22	22	13	20
Particulate Matter (PM10)						
Highest 24-Hr Ave. ($\mu g/m^3$)[b]		50	42	38	NA	NA
Est. Days over State Standard[c]	50	0	0	0		
Est. Days over National Standard[c]	150	0	0	0		
State Annual Average ($\mu g/m^3$)[b,d]	20	16.1	15.4	13.6	NA	NA
Fine Particulate Matter (PM2.5)						
Highest 24-Hr Ave. ($\mu g/m^3$)[b]		15	23	12	17	NA
Est. Days over National Standard[c]	65	0	0	0	0	
National Annual Average ($\mu g/m^3$)[b,e]	15	5.9	6.5	5.7	4.7	NA

NOTE: Values in **bold** are in excess of applicable standard.
NA = Not Available.

[a] Generally, state standards are not to be exceeded and national standards are not to be exceeded by more than once per year.
[b] ppm: parts per million; $\mu g/m^3$: micrograms per cubic meter.
[c] PM is not measured every day of the year. Estimated days over the standard are based on 365 days per year.
[d] State annual average, which is the geometric mean of all measurements; in July 2003 the averaging method was revised from geometric to arithmetic mean.
[e] National annual average, which is the arithmetic mean of the four arithmetic quarterly averages.

SOURCES: NSAQMD (2005) and CARB (2006)

4.3.2 Regulatory Context

Air quality within the region is addressed through the efforts of various federal, state, regional, and local government agencies. These agencies work jointly, as well as individually, to improve air quality through legislation, regulations, planning, policy-making, education, and a variety of programs. The air pollutants of concern and agencies primarily responsible for improving the air quality and the pertinent regulations are discussed below.

Criteria Air Pollutants

Regulation of air pollution is achieved through both national and state ambient air quality standards and emission limits for individual sources of air pollutants. As required by the federal Clean Air Act, the EPA has identified criteria pollutants and established national ambient air quality standards (NAAQS) to protect public health and welfare. NAAQS have been established for ozone, carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), PM10, PM2.5, and lead (Pb). These pollutants are called “criteria” air pollutants because standards have been established for each of them to meet specific public health and welfare criteria.

The NAAQS are defined as the maximum acceptable concentration that may be reached, but not exceeded more than once per year. California has adopted more stringent ambient air quality standards for most of the criteria air pollutants (CAAQS or state standards). **Table 4.3-2** presents both sets of ambient air quality standards (i.e., national and state) and provides a brief discussion of the related health effects and principal sources for each pollutant. California has also established state standards for sulfates, hydrogen sulfide, and vinyl chloride.

Nitrogen Oxides. When combustion temperatures are extremely high, as in aircraft and automobile and truck engines, atmospheric nitrogen combines with oxygen to form various oxides of nitrogen. Nitric oxide (NO) and NO_2 are the most significant air pollutants generally referred to as NO_x. Nitric oxide is a colorless and odorless gas that is relatively harmless to humans, quickly converts to NO_2 and can be measured. Nitrogen dioxide has been found to be a lung irritant capable of producing pulmonary edema. Inhaling NO_2 can lead to respiratory illnesses such as bronchitis and pneumonia.

Ozone. Ozone is a respiratory irritant and an oxidant that increases susceptibility to respiratory infections and that can cause substantial damage to vegetation and other materials. Ozone is not emitted directly into the atmosphere, but is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving reactive organic gases (ROG) and nitrogen oxides (NO_x). ROG and NO_x are known as precursor compounds for ozone. Significant ozone production generally requires ozone precursors to be present in a stable atmosphere with strong sunlight for approximately three hours. Ozone is a regional air pollutant because it is not emitted directly by sources, but is formed downwind of sources of ROG and NO_x under the influence of wind and sunlight. Ozone concentrations tend to be higher in the late spring, summer, and fall, when the long sunny days combine with regional subsidence inversions to create conditions conducive to the formation and accumulation of secondary photochemical compounds, like ozone.

Carbon Monoxide. Carbon Monoxide (CO) is a non-reactive pollutant that is a product of incomplete combustion and is mostly associated with motor vehicle traffic, and in wintertime, with wood-burning stoves and fireplaces. High CO concentrations develop primarily during winter when periods of light winds combine with the formation of ground level temperature inversions (typically from the evening through early morning). These conditions result in reduced dispersion of vehicle emissions. Motor vehicles also exhibit increased CO emission rates at low air temperatures. When inhaled at high concentrations, CO combines with hemoglobin in the blood and reduces the oxygen-carrying capacity of the blood. This results in reduced oxygen reaching the brain, heart, and other body tissues. This condition is especially critical for people with cardiovascular diseases, chronic lung disease or anemia.

Particulate Matter (PM10 and PM2.5). PM10 and PM2.5 are particulate matter that is 10 microns or less in diameter and 2.5 microns or less in diameter, respectively. PM10 and PM2.5 represent fractions of particulate matter that can be inhaled into the air passages and the lungs and can cause adverse health effects. Particulate matter in the atmosphere results from many kinds of dust- and fume-producing industrial and agricultural operations, fuel combustion, wood-burning

TABLE 4.3-2
STATE AND NATIONAL CRITERIA AIR POLLUTANT STANDARDS, EFFECTS, AND SOURCES

Pollutant	Averaging Time	State Standard	National Standard	Pollutant Health and Atmospheric Effects	Major Pollutant Sources
Ozone	1 Hour 8 Hour	0.09 ppm 0.07 ppm	0.12 ppm 0.08 ppm	High concentrations can directly affect lungs, causing irritation. Long-term exposure may cause damage to lung tissue.	Formed when reactive organic gases and nitrogen oxides react in the presence of sunlight. Major sources include on-road motor vehicles, solvent evaporation, and commercial / industrial mobile equipment.
Carbon Monoxide	1 Hour 8 Hour	20 ppm 9.0 ppm	35 ppm 9 ppm	Classified as a chemical asphyxiant, carbon monoxide interferes with the transfer of fresh oxygen to the blood and deprives sensitive tissues of oxygen.	Internal combustion engines, primarily gasoline-powered motor vehicles.
Nitrogen Dioxide	1 Hour Annual	0.25 ppm –	– 0.053 ppm	Irritating to eyes and respiratory tract. Colors atmosphere reddish-brown.	Motor vehicles, petroleum-refining operations, industrial sources, aircraft, ships, and railroads.
Sulfur Dioxide	1 Hour 3 Hour 24 Hour Annual	0.25 ppm – 0.04 ppm –	– 0.5 ppm 0.14 ppm 0.03 ppm	Irritates upper respiratory tract; injurious to lung tissue. Can yellow the leaves of plants, destructive to marble, iron, and steel. Limits visibility and reduces sunlight.	Fuel combustion, chemical plants, sulfur recovery plants, and metal processing.
Respirable Particulate Matter (PM10)	24 Hour Annual	50 µg/m^3 20 µg/m^3	150 µg/m^3 50 µg/m^3	May irritate eyes and respiratory tract, decreases in lung capacity, cancer and increased mortality. Produces haze and limits visibility.	Dust and fume-producing industrial and agricultural operations, combustion, atmospheric photochemical reactions, and natural activities (e.g. wind-raised dust and ocean sprays).
Fine Particulate Matter (PM2.5)	24 Hour Annual	– 12 µg/m^3	65 µg/m^3 15 µg/m^3	Increases respiratory disease, lung damage, cancer, and premature death. Reduces visibility and results in surface soiling.	Fuel combustion in motor vehicles, equipment, and industrial sources; residential and agricultural burning; Also, formed from photochemical reactions of other pollutants, including nitrogen oxides, sulfur oxides, and organics.
Lead	Month Quarter	1.5 µg/m^3 –	– 1.5 µg/m^3	Disturbs gastrointestinal system, and causes anemia, kidney disease, and neuromuscular and neurological dysfunction.	Present source: lead smelters, battery manufacturing & recycling facilities. Past source: combustion of leaded gasoline.

NOTE: ppm = parts per million; µg/m^3 = micrograms per cubic meter.

SOURCE: CARB (2005a)

stoves and fireplaces, and atmospheric photochemical reactions. Some sources of particulate matter, such as demolition and construction activities and mining, are more local in nature, while others, such as vehicular traffic and wood burning stoves and fireplaces, have a more regional effect.

Very small particles of certain substances (e.g., sulfates and nitrates) can cause lung damage directly, or can contain adsorbed gases (e.g., chlorides or ammonium) that may be injurious to health. Particulates also can damage materials and reduce visibility. Large dust particles (diameter greater than 10 microns) settle out rapidly and are easily filtered by human breathing passages. This large dust is of more concern as a soiling nuisance rather than a health hazard. The remaining fraction, PM10 and PM2.5, are a health concern particularly at levels above the federal and state ambient air quality standards. PM2.5 (including diesel exhaust particles) is thought to have greater effects on health, because these particles are so small and thus, are able to penetrate to the deepest parts of the lungs. Scientific studies have suggested links between fine particulate matter and numerous health problems including asthma, bronchitis, acute and chronic respiratory symptoms such as shortness of breath and painful breathing. Children are more susceptible to the health risks of PM2.5 because their immune and respiratory systems are still developing.

In 1983, CARB replaced the standard for "suspended particulate matter" with a standard for suspended PM10 or "respirable particulate matter." This standard was set at 50 $\mu g/m^3$ for a 24-hour average and 30 $\mu g/m^3$ for an annual average. CARB revised the PM10 standard in 2002, pursuant to the Children's Environmental Health Protection Act. The revised PM10 standard is 20 $\mu g/m^3$ for an annual average. In addition, CARB adopted a PM2.5 standard of 12 $\mu g/m^3$ for an annual average.

Sulfur dioxide (SO_2). SO_2 is a combustion product of sulfur or sulfur-containing fuels such as coal and diesel. SO_2 is also a precursor to the formation of atmospheric sulfate, particulate matter and contributes to potential atmospheric sulfuric acid formation that could precipitate downwind as acid rain. The maximum SO_2 concentrations recorded in the project area are well below federal and state standards. Accordingly, the region is in attainment status with both federal and state SO_2 standards.

Lead. Ambient lead concentrations meet both the federal and state standards in the project area. Lead has a range of adverse neurotoxin health effects, and was formerly released into the atmosphere primarily via leaded gasoline products. The phase-out of leaded gasoline in California resulted in decreasing levels of atmospheric lead. The proposed project would not introduce any new sources of lead emissions; consequently, lead emissions are not required to be quantified and are not further evaluated in this analysis.

Toxic Air Contaminants

Toxic air contaminants (TACs) are pollutants that are associated with acute, chronic, or carcinogenic effects but for which no ambient air quality standard has been established. TAC impacts are evaluated by determining if a particular chemical poses a significant risk to human health and, if so, under what circumstances. The ambient background of toxic air contaminants is

the combined result of many diverse human activities, including gasoline stations, refineries, automobiles, industrial operations, and painting operations. In general, mobile sources (such as diesel-fueled trucks) contribute more significantly to health risks than stationary sources. Three TACs are of specific concern in association with mining operations such as the proposed project. These are diesel particulate matter (DPM) from onsite mobile equipment, generators, and haul trucks, asbestos-containing rock, and crystalline silica dust from blasting and fugitive dust sources. TACs would also released within the processing operations such as the ceramic and gold plants.

In 2001, CARB assessed the statewide health risks from exposure to diesel exhaust and to other toxic air contaminants. It is difficult to distinguish the health risks of diesel emissions from the other air toxics, since diesel exhaust contains about 40 different TACs. The CARB study (CARB, 2000) detected diesel exhaust by using ambient air carbon soot measurements as a surrogate for diesel emissions. The Study reported that in 2000, the statewide cancer risk from exposure to diesel exhaust was about 540 per million (i.e., 540 cancers per million people) as compared to a total risk for exposure to all ambient air toxics of 760 per million. This estimate, which accounts for about 70 percent of the total risk from TACs, included both urban and rural areas in the state. It can be considered as an average worst-case for the state, since it assumes constant exposure to outdoor concentrations of diesel exhaust and does not account for expected lower concentrations indoors, where people spend most of their time.

The California Office of Environmental Health Hazard Assessment (OEHHA) has determined that chronic exposure to DPM can cause carcinogenic and non-carcinogenic health effects. OEHHA has specified an acceptable exposure level (AEL) of DPM as a non-carcinogen of 5 $\mu g/m^3$ (annual average). OEHHA has also established a unit risk value for DPM, which is the increased probability of contracting cancer if exposed to an average concentration of 1 $\mu g/m^3$ for 70 years. The unit risk value established for DPM is 300 in a million per microgram per cubic meter.

Asbestos Toxic Air Control Measure

On July 22 of 2002, CARB adopted a new Asbestos Airborne Toxic Control Measure for construction, grading, quarrying and surface mining operations. New emission control measures, such as dust suppressants, will apply to activities such as road construction and road maintenance, construction, grading, and quarrying and surface mining operations in areas with naturally-occurring asbestos/serpentine rock. Serpentinite is a common rock throughout the State of California, including Nevada County, where it occurs near many of the large fault zones. It has been designated the state rock. At the Idaho-Maryland Mine, serpentinite occurs on the westernmost end of the property. Serpentinite is composed of serpentine minerals, and can include fibrous asbestos minerals. Asbestos minerals tend to occur where the rocks have been altered or sheared.

Silica Crystalline Dust

In February 2005, OEHHA added a chronic reference exposure level (REL) for crystalline silica[2]. The chronic REL for crystalline silica was established by the California OEHHA as 3 μg/m^3. Crystalline silica is a hazardous substance when it is inhaled. At least 1.7 million U.S. workers are exposed to respirable crystalline silica in a variety of industries and occupations, including construction, sandblasting, and mining. Silicosis, an irreversible but preventable disease, is the illness most closely associated with occupational exposure to the material, which also is known as silica dust. Occupational exposures to respirable crystalline silica are associated with the development of silicosis, lung cancer, pulmonary tuberculosis, and airways diseases. These exposures may also be related to the development of autoimmune disorders, chronic renal disease, and other adverse health effects (NIOSH, 2006).

Odors and Nuisances

Though offensive odors from stationary sources rarely cause any physical harm, they still remain unpleasant and can lead to public distress generating citizen complaints to local governments. The occurrence and severity of odor impacts depend on the nature, frequency and intensity of the source; wind speed and direction; and the sensitivity of receptors. The *CEQA Guidelines* recommends that odor impacts be considered for any proposed new odor sources located near existing receptors, as well as any new sensitive receptors located near existing odor sources. Generally, increasing the distance between the receptor and the source will mitigate odor impacts. Odors may be associated with the ceramic and gold processing and the water treatment plant.

Regulatory Agencies

EPA is responsible for implementing the myriad of programs established under the federal Clean Air Act, such as establishing and reviewing the NAAQS and judging the adequacy of State Implementation Plans (SIPs), but has delegated the authority to implement many of the federal programs to the states while retaining an oversight role to ensure that the programs continue to be implemented.

CARB is responsible for establishing and reviewing the state standards, compiling the California SIP, securing approval of that plan from EPA, and identifying toxic air contaminants. CARB also regulates mobile emission sources in California, such as construction equipment, trucks, and automobiles, and oversees the activities of air quality management districts, which are organized at the county or regional level. The county or regional air quality management districts are primarily responsible for regulating stationary sources at industrial and commercial facilities within their jurisdictions and for preparing the air quality plans that are required under the federal Clean Air Act and California Clean Air Act. These regional air quality plans prepared by districts throughout the state are compiled by CARB to form the SIP. The local air districts also have the responsibility and authority to adopt transportation control and emission reduction programs for indirect and area-wide emission sources.

2 http://www.oehha.ca.gov/air/chronic_rels/silica_final.html

Air Quality Plans and Policies

As required by the federal Clean Air Act and the California Clean Air Act, air basins or portions thereof have been classified as either "attainment" or "nonattainment" for each criteria air pollutant, based on whether or not the standards have been achieved. Nonattainment areas are also required to prepare air quality plans that include strategies for achieving attainment. The project area is in attainment of both the NAAQS and the CAAQS for PM2.5, NO_2, SO_2, CO, and lead (CARB, 2005b). The NSAQMD is nonattainment of the NAAQS for ozone (8-hour) and is in nonattainment of the CAAQS for PM10 and ozone. It is recognized that the nonattainment status of the NSAQMD with respect to the state ozone standard is primarily a result of pollutant transport from the Sacramento Valley, San Joaquin Valley, and the Bay Area and not locally generated.[3]

State

California Air Resource Board Diesel Exhaust Control Program

Current regulations apply emission standards to model years 1987 through 2003 for heavy-duty diesel truck and bus engines. Applicable to the 1994 and following year standards, sulfur content in the certification fuel has been reduced to 500 ppm. In October 1997, EPA adopted new emission standards for model year 2004 and later heavy-duty diesel truck and bus engines. These standards reflect the provisions of the Statement of Principles signed in 1995 by the EPA, CARB, and the manufacturers of heavy-duty diesel engines. The goal was to reduce NO_x emissions from highway heavy-duty engines to levels approximately 2.0 grams per brake horsepower-hour (g/bhp·hr) beginning in 2004.[4] These current emission standards were accounted for within this analysis.

In August of 1998, CARB identified particulate emissions from diesel-fueled engines DPM as TACs. CARB developed the *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles* and the *Risk Management Guidance for the Permitting of New Stationary Diesel-Fueled Engines*. The Board approved these documents on September 28, 2000. The documents represent proposals to reduce diesel particulate emissions, with the goal being to reduce emissions and the associated health risk by 75 percent in 2010 and by 85 percent in 2020. The program aims to require the use of state-of-the-art catalyzed diesel particulate filters and ultra low sulfur diesel fuel.

In December 2000, the EPA promulgated regulations requiring that the sulfur content in motor on-road vehicle diesel fuel be reduced to less than 15 ppm by June 1, 2006. Control of DPM emissions focuses on two strategies, reducing the amount of sulfur in diesel fuel and developing filters for operating diesel engines to reduce the amount of particulate matter that is emitted. Secondly, the EPA finalized a comprehensive national emissions control program, the 2007 Highway Diesel program (HD 2007), which regulates highway heavy-duty vehicles and diesel fuel as a single system. Under the HD 2007 program, the EPA established new emission

[3] http://www.nccn.net/~nsaqmd/transport.pdf
[4] Further information on current regulations which apply to heavy-duty trucks, can be found at www.dieselnet.com/standards/us/hd.html.

standards that would significantly reduce PM and NO_x from highway heavy-duty vehicles. These standards were accounted for within this analysis.

In May 2003, the EPA proposed new emission standards for nonroad diesel engines and sulfur reductions in nonroad diesel fuel that would dramatically reduce emissions attributed to nonroad diesel engines. This would affect emissions from construction equipment, locomotives, and marine diesels. As these emission standards are proposed, their benefits were not accounted for within this analysis.

As proposed, the new engine standards would take effect in 2008. The EPA estimates that PM would be reduced 95 percent, NO_x would be reduced 90 percent, and SO_x would be virtually eliminated as an emission from this source. Sulfur in nonroad diesel fuel would be reduced 99% from existing levels. In June of 2007, the interim cap of sulfur content would be 500 ppm. In June of 2010, sulfur would be limited to 15 ppm (ultra low sulfur fuel). The Tier 1 emission standards for nonroad diesel engines were set in 1994 and affect engines greater than 50 horsepower (hp). The Tier 2 and Tier 3 standards were set in 1998 and affected engines less than and greater than 50 hp. The new standards would affect engines ranging from 3 to 3,000 hp. Again, the EPA is proposing a "tiered" method of implementing the standard based on the engine capacity of the equipment.

Regional

Northern Sierra Air Quality Management District

The proposed project is under jurisdiction of the NSAQMD (District), which regulates air quality according to the standards established in the Clean Air Acts and amendments to those acts. The District regulates air quality through permitting authority and through air quality related planning and review activities over most types of stationary emission sources.

The District implements a smoke management program, which includes review and comment on burn plans; field review/inspections of complex burn projects or projects that may impact sensitive, populated areas; permitting; tracking "pile and burn" type timber harvests; investigating complaints; and reporting burn acreage and fuel loading to CARB.

The District reviews development proposals to ensure that air quality impacts are adequately assessed and mitigated in accordance with attainment planning efforts. Planning efforts are focused at preventing air quality degradation and violations of the California and National AAQS.

Local

Nevada County General Plan[5]

As noted above, the overall air quality in Nevada County is very good. However, there are several areas in the County that do not meet State and Federal ambient air quality standards.

[5] Under the proposed project, Nevada County plans and policies would only apply to the New Brunswick site, which would not be annexed into the City of Grass Valley as part of this proposed project.

Consideration of a variety of site-specific measures can provide means to protect the County's air quality resources. The Nevada County General Plan includes an Air Quality element which contains a number of guiding goals, objectives that would apply to the proposed project. Additional applicable policies related to air quality can be found in the General Plan's Circulation (Policies 4.7, 4.16, 4.25, 4.28, and 4.30), Land Use (Policy 1.17) sections. The County has adopted the following applicable goals, objectives, and policies:

- Goal 14.1: Attain, maintain and ensure high air quality.
- Objective 14.1: Establish land use patterns that minimize impacts on air quality.
- Policy 14.1: Cooperate with NSAQMD, during review of development proposals. As part of the site plan review process, require applicants of all subdivisions, multi-family, commercial and industrial development projects to address cumulative and long-term air quality impacts, and request the District enforce appropriate land use regulations to reduce air pollution.
- Objective 14.2: Implement standards that minimize impacts on and/or restore air quality.
- Policy 14.2: Include the following as part of the Comprehensive Site Development Standards:

    b. Require all installations of solid fuel-burning devices comply with the current Federal EPA emission standards;

- Policy 14.3: Where it is determined necessary to reduce short-term and long-term cumulative impact, the County shall require all new discretionary projects to offset any pollutant increases. Wherever possible, such offsets shall benefit lower-income housing.
- Policy 14.4: Encourage and cooperate with the NSAQMD, or any successor agency, to:

    c. Adopt control measures to reduce pollutant emissions from open burning;

    d. Develop a program to regulate and control fugitive dust emissions from construction projects; and

    e. Identify and establish visibility standards for air quality in the County.

- Policy 14.5: Encourage and cooperate with the NSAQMD, or any successor agency, to develop and implement a long term monitoring program to quantify air quality in the County. The County shall work with the District to identify areas for monitoring and to develop an implementation program to begin on-site monitoring upon project application where a proposal will result in an increase of more than 25 tons per year of non-attainment pollutants (or precursors). The County will also cooperate with the District in developing a monitoring program for CO emissions at key intersections as a basis for consideration of short- to long-term air quality in the preparation of the County Road Improvement Program.
- Policy 14.6: For new construction, the County shall prohibit the installation of non-EPA certified and non-EPA exempt solid fuel burning devices.

- Policy 14.7: The County shall cooperate with all appropriate agencies and other regional transportation agencies that include surrounding counties to develop programs designed to maximize the participation of employers in employer-operated van pool and/or ride sharing for employees, and mass transit service for both employees and customers.

- Policy 14.7A: The County shall, as part of its development review process, ensure that proposed discretionary developments address the requirements of NSAQMD Rule 226.

- Policy 14.7B: The County shall, as part of its Road Improvement Program, consider the benefits to air quality from the paving of unpaved roads.

- Objective 14.3: Identify regional impacts and coordinate with other agencies to achieve attainment.

- Policy 14.8: Consider adoption of Joint Powers Agreements or similar legal mechanisms with other counties located within Nevada County's regional sphere to comprehensively address regional air quality impacts as a result of development in each County.

(Nevada County, 1996).

City of Grass Valley General Plan

To meet the requirements of state law, all cities and counties in California are required to prepare and adopt a General Plan. The City of Grass Valley 2020 General Plan is the City's current General Plan. Elements within the General Plan include a number of guiding goals and policies, implementing programs to carry out goals and policies, and background data to provide the basis for the goals and policies. Elements related to land use, circulation, and conservation contain air quality goals, objectives, and policies that would apply to the proposed project. The City has adopted the following applicable policies and implementation actions related to air quality:

- Policy 22-COSP: Implement circulation/transportation measures designed to reduce reliance on the automobile.

- Policy 23-COSP: Respond appropriately to State and federal air and water quality policies and policy changes, understanding the implications of regulations and standards, and maintaining a continuing public education program.

- Implementation Action 16-COSI: Study and consider a permanent ban on open burning within the City limits.

- Implementation Action 17-COSI: Incorporate applicable mitigation measures specified in the Indirect Source Review Guidelines of the Northern Sierra Air Quality Management District, in all future discretionary land use approvals.

(City of Grass Valley, 1999).

4.3.3 Impacts Discussion

Methods

The effort to identify potential air quality impacts from the proposed project was based on a review of existing documentation of air quality conditions in the region, air quality regulations from the U.S. Environmental Protection Agency (U.S. EPA), the California Air Resources Board (CARB), and the Northern Sierra Air Quality Management District (NSAQMD).

The Western Region Climatic Center was used to develop the climatic setting and NSAQMD and CARB were used to develop ambient air quality monitoring data summaries. The Nevada County General Plan and City of Grass Valley General Plan provide a context of regional air quality policies and contains a number of guiding goals and objectives that would apply to the proposed project. NSAQMD's Guideline for Assessing Air Quality Impacts of Land Use Project provides the general methodologies under which a project-level analysis would be conducted and the impact discussion follows these guidelines.

Construction and operational assumptions such as construction duration, construction schedule, types of processing equipment, vehicle trips, were based on information provided within the Expanded Environmental Assessment for the Proposed Maryland-Idaho Mine Project including Appendix I, Air Quality.

Significance Criteria

According to CEQA Guidelines Appendix G, a project would have a significant air quality impact if it would:

- Conflict with or obstruct implementation of the applicable air quality plan;
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation;
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors);
- Expose sensitive receptors to substantial pollutant concentrations; or
- Create objectionable odors affecting a substantial number of people.

The significance determinations, appropriate mitigation measures, and methodologies for determining air emissions would be based on NSAQMD's *Guideline for Assessing Air Quality Impacts of Land Use Project* (NSAQMD, 2000). For project-level impact analysis (construction and operational), NSAQMD provides various thresholds and tests of significance that are used to determine whether a project would conflict with or obstruct implementation of the air quality

plan, violate any air quality standard or contribute substantially to an existing or projected air quality violation or expose sensitive receptors to substantial pollutant concentrations.

All of the emissions from the project would be reviewed by the NSAQMD to assure both short- and long-term air pollution emissions are mitigated to below the level of significant air quality impacts. Thresholds of significance illustrate the extent of an impact and are a basis from which to apply mitigation measures. The District has developed a tiered approach to significance levels; a project with emissions qualifying it for Level A thresholds will require the most basic mitigations. Projects which qualify for Level B will require more extensive mitigations, and subsequently, those projects which qualify for Level C will require the most extensive application of mitigations. The tiered thresholds for Level A, B and C are given in **Table 4.3-3** for a projects' estimated emissions of criteria pollutants in pounds per day. These tiered thresholds will be compared to project construction and operational emissions per NSAQMD guidelines.

TABLE 4.3-3
NSAQMD EMISSION SIGNIFICANCE THRESHOLDS

NO_x	ROG	PM10
Level A Thresholds $\leq$ 24 lbs/day	$\leq$ 24 lbs/day	$\leq$ 79 lbs/day
Level B Thresholds 25-136 lbs/day	25-136 lbs/day	80-136 lbs/day
Level C Thresholds $\geq$137 lbs/day	$\geq$137 lbs/day	$\geq$137 lbs/day

SOURCE: NSAQMD (2000)

NO_x, ROG and PM10 emissions must be mitigated to a level below significant. If emissions for NO_x, ROG and/or PM10 exceed 136 pounds per day (Level C), then there is a *significant* impact; below Level C would be *potentially significant.* It is expected that projects with higher emissions (Level C Thresholds) will automatically mitigate more emissions, quantitatively, than will a lower impact project (Level A).

If a new project is unable to provide adequate on-site mitigation of long-term air quality impacts, an off-site mitigation program may be necessary. Projects emitting certain high levels of pollutants would be required to implement all feasible on-site mitigation measures and participate in an offsite mitigation program to reduce emissions. Impacts of local pollutants are cumulatively significant when dispersion modeling shows that combined emissions from the project and other existing and planned projects would exceed air quality standards.

Results

Construction

Impact 4.3-1: Project construction emissions would result in intermittent, temporary increases in air pollutant emissions. This would be a potentially significant impact.

Construction-related dust emissions[6] would vary from day to day, depending on the level and type of activity, silt content of the soil, and the weather. In the absence of mitigation, construction activities may result in significant quantities of dust, and as a result, local visibility and PM10 concentrations may be adversely affected on a temporary and intermittent basis during the construction period. In addition, the fugitive dust generated by construction would include not only PM10, but also larger particles, which would fall out of the atmosphere within several hundred feet of the site and could result in nuisance-type impacts. Combustion emissions from heavy equipment and construction worker commute trips would also vary from day to day, and would contribute incrementally to regional ozone concentrations during the construction period.

Fugitive dust would occur both during the construction activity and as a result of wind erosion over exposed earth surfaces. Clearing and earthmoving activities generally comprise the major source of construction dust emissions, but traffic and general disturbance of the soil also generate significant dust emissions.

Construction activities would occur on the Idaho-Maryland, New Brunswick, and Round Hole sites. The work would consist of clearing and grubbing, excavation, backfilling, grading, and construction of ponds, buildings, and other structures. The project includes construction of over 250,000 square feet of building space. The construction would take place in three phases over a five-year period. The initial 18-month construction phase would take place on the Idaho-Maryland and New Brunswick sites. The second 18-month construction phase would be restricted to the Idaho-Maryland site. The last 12-month construction phase would take place on the Idaho-Maryland and Round Hole sites. Chapter 3, *Project Description*, provides detailed information regarding the construction equipment, the number of construction workers and truck trips, and the specific construction schedule.

Construction activities would also be a source of reactive organic gas emissions. Solvents in adhesives, non-waterbased paints, thinners, some insulating materials, and caulking materials would evaporate into the atmosphere and be precursors in the photochemical reaction that creates ozone. In general, these types of sources are small and intermittent, and do not significantly affect air quality.

The primary effect of construction activities would be increased dust and a locally elevated level of particulate matter, although the severity would vary greatly over the period of construction with the level and type of activities occurring and the weather. Dust could be a temporary

6 Fugitive dust emissions related to the construction phase of the project; that is, the initial period when site grading and construction of the processing operations are to occur, but before excavation and production begins.

nuisance at neighboring properties, requiring more frequent washing of exposed surfaces during the construction period.

As part of the project, dust control measures would include:

- Water to control dust during demolition and loading and unloading activities;
- Suspend dust-producing activities during periods of high winds when dust control measures are unable to avoid visible dust plumes;
- During the dry season (May-October) provide equipment and staffing for watering of unpaved haul roads, areas being graded and equipment/vehicle parking areas at least twice daily;
- Daily removal of mud and dirt carried out from the site to adjacent paved roads; and
- Limit the speed of equipment and vehicles to 15 miles per hour while traveling on unpaved surfaces on the site.

To determine the significance level of construction activities and the appropriate additional mitigation measures required for this project, air emissions from construction activities will need to be estimated. These air emission calculations should be based on CARB URBEMIS emissions model or other appropriate tools along with the use of project specific construction data such as the type of construction activities, type of equipment and its usage, and the number of construction workers and truck trips. The following is a list of the NSAQMD's standard mitigation measures based on the level of significance thresholds:

Mitigations Suggested for Use during Construction Phase of Project

For all Significance Level Thresholds (A, B and C)

a. Alternatives to open burning of vegetative material will be used unless deemed infeasible by the District. Among suitable alternatives are chipping, mulching, or conversion to biomass fuel.

b. Adequate dust control measures will be implemented in a timely and effective manner during all phases of project development and construction.

c. All material excavated, stockpiled, or graded should be sufficiently watered, treated or covered, to prevent fugitive dust from leaving property boundaries and causing a public nuisance or a violation of an ambient air standard. Watering should occur at least twice daily with complete site coverage, preferably in the mid-morning and after work is completed each day.

d. All areas (including unpaved roads) with vehicle traffic should be watered or have dust palliatives applied, as necessary, for regular stabilization of dust emissions.

e. All on-site vehicles should be limited to a speed of 15 mph on unpaved roads.

f. All land clearing, grading, earth moving or excavation activities on a project will be suspended as necessary when winds are expected to exceed 20 mph.

g. All material transported off-site will be either sufficiently watered or securely covered to prevent a public nuisance.

h. Temporary traffic control will be provided during all phases of the construction to improve traffic flow as deemed appropriate by local transportation agencies and/or Caltrans.

i. Construction activities should be scheduled to direct traffic flow to off-peak hours as much as practicable.

For Classifications as Level B Threshold

j. All controls discussed above (a through i) should be implemented.

k. All inactive portions of the construction site should be covered, seeded, or watered until a suitable cover is established.

l. County-approved non-toxic soil stabilizers shall be applied, according to manufacturer's specifications, to all inactive construction areas (previously graded areas which remain inactive for 96 hours) in accordance with the local grading ordinance. Acceptable materials that may be used for chemical stabilization of soils include petroleum resins, asphaltic emulsions, acrylics and adhesives which do not violate Regional Water Quality Control Board or CARB standards.

For Classification as Level C Threshold

m. All controls discussed above (a-l) should be implemented.

n. During initial grading, earth moving, or site preparation, larger projects may be required to construct a paved (or dust palliative treated) apron, at least 100 feet in length, onto the paved road(s).

o. Wheel washers will be installed where project vehicles and/or equipment enter and/or exit onto paved streets from unpaved roads on larger projects. Vehicles and/or equipment will be washed prior to each trip, if necessary.

(NSAQMD, 2000).

Operation

Impact 4.3-2: The proposed project would generate emissions of criteria pollutants (PM10, NO_x, CO, SO_2, and ROG) at the project sites and along haul routes. Project-generated emissions would potentially be above the applicable significance threshold. This would be a potentially significant impact.

Initially, a temporary mobile crusher would be used at the surface during initial development of the decline. The temporary crusher would include a vibrating screen that feeds a jaw crusher. The crusher would discharge onto a belt conveyor that would load haul trucks. Within one year of the start of the decline tunnel development, the mobile crusher would be moved underground and be fed by Load/Haul/Dump (LHD) vehicles and/or haul trucks. Then, haul trucks would be used to move the crushed rock to the surface stockpile. This underground temporary crusher would process mine rock for the surface stockpiles until a permanent crusher can be located at greater depth, roughly three years after the start of the decline. LHDs would then bring run of mine material to the crusher, and a belt conveyer would move the crushed material to the surface stockpiles.

Air quality impacts would be associated with all phases of mining operations but would be most prevalent during the processing and transportation operations prior to establishing the permanent underground crusher. Material products would generally first be loosened by drilling and blasting, then worked and transported by heavy equipment and conveyors. Processing operation dust is generated mainly by the crushing and screening phases. As materials are broken by rapid compression, the dust particulates become airborne. When conveyors drop screened rock onto stockpiles, additional dust particulates can escape and become airborne. Loading and hauling vehicles on the site or along access roads would also generate fugitive dust. Vehicular and site equipment exhaust emissions would be generated by a variety of gasoline and diesel-powered equipment.

After the crushing operation is moved underground and the ore is moved to the surface stockpiles via conveyors rather than with haul trucks, most of these emission sources would occur underground. However, ventilation of the underground workings would result in the release of emissions to the atmosphere.

Potential air pollutant impacts include dust and combustion emissions from the following activities:

- Underground operations – drilling, blasting, mucking, screening, crushing
- Ore transport and storage – hauling, conveying, stockpiling
- Ore processing – screening, crushing, grinding, classification
- Ceramic feed preparation and heating
- Glaze preparation and application
- Vehicle traffic (worker, haul, and equipment).

Air emissions of criteria pollutants (PM10, NO_x, CO, SO_2, and ROG) at the project site and along haul routes will need to be determined based on available information regarding the processing operations and haul truck data. The air emission calculations should account for the proposed production level, the number, types, and size of equipment, and the type of material processed and emission controls, if any. The emission factors should be determined using the methodology found in EPA's AP-42, manufacturer's data, permit documents, CARB's EMFAC2002, or other appropriate references. Emissions of NO_x may be significant as a result of the burning of natural gas as part of the ceramics plant and the mobile equipment. Emissions of PM10 may be significant due to fugitive dust from mining operations. Emissions of ROG may be significant due to glaze operations, the ceramic plant, and onsite mobile equipment and haul trucks.

The blasting activities and potential impacts of asbestos to the ambient air via vent shafts may be of concern. Blasting emission factors would be determined using the methodology found in the *Sonoma County Aggregate Resources Management Plan and Environmental Impact Report* (Sonoma County 1994). The emission factors would account for the amount of air ventilation to estimate the air emissions within the ambient air.

Air emissions from operations will be estimated using documents and models from CARB, EPA, and other applicable references. These emissions estimates will then be used to evaluate against appropriate thresholds to determine the appropriate mitigation measures required for this project.

Impact 4.3-3: The proposed project would generate DPM emissions from on-site mobile sources and TAC emissions from processing operations. These emissions would have the potential to increase exposure to project TAC emissions at nearby receptors. This would be a potentially significant impact.

DPM emissions will need to be calculated for the on-site diesel equipment and for on-site haul trucks for project conditions. The estimated DPM emissions should account for the production rate from the project, as well as the phasing-in of cleaner off-road diesel engines that would be used on the project. DPM emissions related to the project would be from on-site equipment (loaders, dozers, etc.), backup generators, and on-site haul trucks. The carcinogenic and non-carcinogenic health risks from the proposed project will need to be estimated by conducting dispersion modeling of DPM emissions from these on-site sources.

TAC emissions would also be released by the ceramic and glaze operations. These TACs would include metals and volatile organic compounds which may have the potential to cause carcinogenic and non-carcinogenic health effects. TAC emissions on the project site will be determined based on available information regarding the processing operations and available emission factors. The carcinogenic and non-carcinogenic health risks from the proposed project will need to be estimated by conducting dispersion modeling of TAC emissions from these on-site sources.

Impact 4.3-4: The proposed project would generate localized CO emissions at intersections in the project vicinity. This would be a potentially significant impact.

Traffic generated by the project would have the potential to affect CO concentrations along surface streets, intersections, and near stagnation points such as major highways and heavily traveled and congested roadways. Vehicular emissions will need to be computed using CARB's emission factor model, EMFAC2002. EMFAC is CARB's computer model to estimate past, present, and future on-road emissions of HC, CO, NO_x, PM, and SO_2. As with DPM, CALINE4 will need to be used to determine CO concentrations along the roadways utilized by worker traffic and project-generated trucks.

Impact 4.3-5: Operational activities associated with project implementation could lead to increases in odorous emissions. This would be a potentially significant impact.

While offensive odors rarely cause any physical harm, they can still be very unpleasant, leading to considerable distress among the public and often generating citizen complaints to local governments and the NSAQMD. The occurrence and severity of odor impacts depends on numerous factors, including the nature, frequency, and intensity of the source, the wind speed and direction, and the sensitivity of the receptor. Odor impacts on residential areas and other sensitive receptors warrant the closet scrutiny, but consideration should be given to other places where people may congregate, such as recreational facilities, work sites, and commercial areas.

Odors from this project may be associated with the ceramic and gold processing and the water treatment plant. Project emissions will need to be evaluated for odorous nature and potential frequency of impacts at sensitive receptors.

Impact 4.3-6: The proposed project, together with anticipated cumulative development in the area, would contribute to regional criteria pollutants. This would be a potentially significant impact.

A project's contribution to cumulative impacts should be considered significant if the project's impact individually would be significant (i.e., exceeds the quantitative thresholds). For a project that would not result in a significant impact individually, the project's contribution to any cumulative impact would be considered less than significant if the project is consistent with the local General Plan and the local General Plan is consistent with the applicable regional air quality plan. Lastly, impacts of local pollutants are cumulatively significant when dispersion modeling shows that combined emissions from the project and other existing and planned projects will exceed air quality standards as per NSAQMD guidelines. Project emission calculations will need to be compared to significance thresholds and the local General Plan, and their consistency with the regional air quality plan will need to be determined.

4.3.4 Data Gaps

1. Additional information regarding air emissions from the air quality Authority-to-Construct Permit is needed. If an ATC will not be submitted until completion of the CEQA analysis, the applicant should provide all relevant information regarding manufacturer specification and initial air emissions estimations for the equipment to be used for the project. For the air emission sources which are likely to require a permit from the NSAQMD (e.g., backup generator, kilns, furnaces, and dryers), provide the stack/vent parameters such as diameter, height, exhaust flow rate, exhaust temperature.

2. Is there a frit furnace within the ceramic processing units?

3. Provide the size, fuel type, expected hours of operation, and location of the emergency generators and water treatment plant pump stations (if applicable).

4. Provide Figure 1 Flow Diagram 2400 STPD, Section 1 (FDR) and Section 2 (MP) Applications, Volume 1 of the Application documents, as the referenced is not contained within the documents received.

5. Information on the process material crystalline silica content and asbestos content and the fluorine content in the ceramic raw material is needed.

6. Will the haul trucks be owned by the mining operator?

References – Air Quality

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